# Industrial Finishing

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# With the Editor

THIS MONTH CLOSES 1925, as we mark time on the calendar, but in the matter of progress the end of 1925 and the beginning of 1926 is merely a passing mile post. Ambitious plans for the future, present industrial and commercial activities ranging in the scale as we know them from the smallest to the largest, and the element of general prosperity throughout the U. S.—all this continues with increasing volume.

Anyone who has traveled widely, mixed freely and observed closely this year must acknowledge the presence of a condition commonly called "spotty" in some industries and some localities. It isn't picturing a true condition to paint the whole U. S. map a solid color and call it 100 per cent prosperous. One must do some stippling.

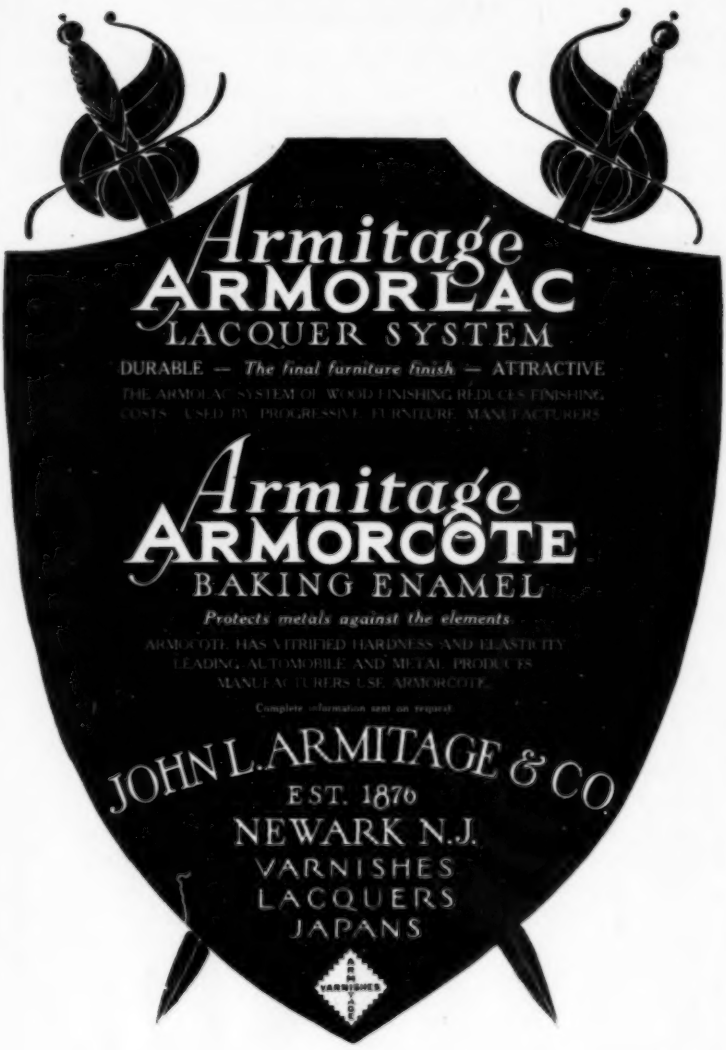
But consider the size of this country, the varied activities of its 115,000,000 people, the ever-changing conditions due to numerous improvements and the development of many new things. Point to a slowing up or recession of activities in one line or one locality, and if you look you will see in one or more other lines or localities a remarkable stimulation—always to an extent that more than offsets the dullness elsewhere.

In everything that pertains to finishing and painting we have seen improvements and developments this year. We will see more next year and they will all be for the betterment of the industry as a whole, whether some individuals or firms see it at once or not. Make this resolution or, if you have made it before, renew it now: Look ahead and keep informed. Read INDUSTRIAL FINISHING carefully and write INDUSTRIAL FINISHING frequently in 1926.

In conclusion we extend you the season's greetings—wishing you a Merry Christmas and a Happy, Prosperous New Year.

W. H. Rohr

Managing Editor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# Modern-'Cellulose Lacquers—I

*Sales Manager of Commercial Solvents Corporation delivers, at the Tenth Exposition of Chemical Industries, an instructive address on the characteristics and uses of modern nitro-cellulose lacquers*

By Arthur Orr

NITRO-CELLULOSE lacquers are applied under ordinary conditions of temperature, pressure and humidity. I will, therefore, in any comparison refer only to similar materials and will exclude those which require special conditions in connection with their application.

The following is a rough outline of the considerations to be taken into account in passing on the merit of any coating material:

(1) Its availability; which involves the sources of raw material, the equipment and processes used in its manufacture, price, etc.

(2) Its general characteristics in liquid form, such as inflammability, toxicity (poisonousness), odor, keeping qualities, possibilities in color range, glass range, etc.

(3) Its application, including the preparation of under-surfaces, speed of drying, cost of application, etc.

(4) Its performance after application.

### All Ingredients Available

All the ingredients of the modern lacquer are obtainable in practically unlimited quantities at fairly stable prices. There is reason to believe that the supply of these materials will constantly increase and that their cost will diminish. They are obtained either synthetically or from raw materials such as cotton, corn, and coal, etc., of which there will always be an adequate supply.

Some fossil gums are now used in many lacquers, but this is not obligatory, and there is certainly nothing to indicate that the use of lacquer will ever be limited through the exhaustion of natural deposits of these resins.

The manufacture of lacquer, while requiring technical knowledge and experience of a high order, does not call for as large an initial investment, or as much floor space per unit of output as does the manufacture of oleo-resinous coatings.

The cost to the consumer of lacquers now on the market is greater than the first cost of corresponding oleo-resinous materials. The real cost, which takes account of lessened floor space, greater output per man hour, greatly reduced inventory, tie-up, greater durability, and lessened sales resistance is much less.

### Not So Dangerous

The general characteristics of lacquer during manufacture and before application are not unlike those of other materials. Its friendly enemies have dwelt on its inflammability. The fact that nitrated cotton is one of its ingredients seemed to present a delightfully easy point for attack.

But there are different kinds of nitrated cotton, (depending on the degree of nitration), and pyroxylin, the particular kind used in lacquers, although inflammable,

is not explosive. When mixed with solvents and with the usual gums and pigments it is perhaps as dangerous as a can of cut shellac.

The most dangerous common lacquer ingredient, both from the point of view of inflammability and of toxicity, is undoubtedly benzol, but as this has been used for many years in non-lacquer coatings I will not dwell on its properties. Aside from benzol, and similar coal-tar products, all of the common lacquer ingredients are practically non-poisonous.

### Odor of Lacquers

There has been much talk about the odor of lacquers. In this connection let me emphasize the fact that odor and toxicity are two very different things. Many highly poisonous gasses are completely odorless.

As to odor of itself we must, in dealing with lacquers, make a clear distinction between odor of the vapors during evaporation of the solvents, and residual odor which may remain in the film after it is in use. In industrial finishing, odor of evaporation is not a factor because fortunately the sense of smell is highly accommodating and our noses soon cease to register an odor which on first exposure may even have seemed nauseating or irritating. After working for a few days in the usual concentration of these vapors men cease to notice the smell at all.

It is, therefore, rather to guard against toxic effects than to diminish odor that manufacturers equip their finishing rooms with ventilative fans and spraying booths.

In the case of brushable lacquers odor of evaporation is less, other things being equal, than with spray lacquers because the need of more longer flow and slower drying calls for the use of less volatile solvents. Furthermore, it is quite possible to obtain a solvent mixture of proper volatility which has little, if any, odor even during evaporation.

Residual odor in a lacquer film is entirely due to impurities in one or more of its ingredients. All the usual lacquer ingredients are available today in such purity as will obviate any risk of residual odor.

### Color and Luster

The keeping qualities of lacquer are about the same as with other materials. Exposure to heat tends to reduce viscosity, and, of course, impure ingredients may result in the formation of an excess acidity, but these difficulties are unimportant or can be avoided. Lacquer may be clear, stained or pigmented. The possibilities in color, particularly for inside exposure, are at least as wide as in the field of oleo-resinous materials.

There is, perhaps, a popular idea that a lacquer finish must be less glossy than an oleo-resinous film. It is true that a polished film of pigmented lacquer has less depth than an enamel film on which one or more coats of transparent varnish have been applied. Depth of finish is a function of transparency and thickness. On automobiles, in order to get full lacquer durability, and because a pigmented lacquer film is much more resistant to sunlight than a clear film, we usually dispense with the clear final coats.

In its application, owing to rapid drying, lacquer should be put on evenly and rapidly. Fortunately, mechanical appliances for suitable application of this material have recently been

brought to a high state of perfection. The modern spray gun not only enables the industrial finisher to obtain perfect application, but it also greatly increases the area which his men can cover per unit of time, as compared to what they might have covered with a brush.

(To be continued)

## Installation Suggestions

The accompanying picture shows a small, compact, motor-driven compressor and air receiver outfit in service in an automobile refinishing shop, where one new spray booth is used.

An observer suggests that the wood plank platform for this outfit be stripped of the cleats underneath and anchored flat and solid to the floor, or on a raised solid foundation of timbers or concrete, to eliminate vibration during operation. Also, that the air intake to the compressor be muzzled with a screen or strainer, and that iron piping instead of hose be used to transmit compressed air to the spray booth which is 60-ft. away.—E. F. G.

### *Standard Varnish Works and Standard Varnish Co. Combine*

Announcement is made that a contract has been signed whereby the Standard Varnish Works acquires the capital stock of the Standard Varnish Co. of Illinois. As soon as the necessary details have been concluded, the entire company will operate as the Standard Varnish Works.

Territorial operations will be conducted exactly as heretofore and the officers of the Standard Varnish Co. of Chicago will remain as at present: J. Heath Wood, president; L. K. Miller, treasurer; W. B. Day, secretary. Mr. Wood also becomes vice-president and director of the Standard Varnish Works whose board will then consist of:

W. C. Appleton, New York, secretary; Jerome W. Frank, New York, technical director; A. E. Campbell Harris, London, managing director; Morton Horkheimer, New York, sales manager; Arthur D. Robson, New York, vice-president in charge of operations; J. W. Robson, New York, president; Theodore Robson, London, first vice-president; William Rosenberg, New York, second vice-president; James S. Wolf, New York, treasurer; and J. Heath Wood, Chicago, vice-president in charge of sales.

Notwithstanding the separation which took place between the eastern and western divisions of the Standard Varnish Works in 1918, the companies have been operating upon the same formulae and trade marks—but under different names and for different interests.

About the first of this year both companies experienced a change in management and since then consistent efforts have been made to effect this amalmagation because, through this unification of interests there is created a singleness of purpose which will result in more vigorous merchandising and consequent increased efficiency in serving the trade. As a result, Standard Varnish Works expects further rapid growth in spite of the fact that 1925 has been the most prosperous year of the 55 years of its existence.

Th executive offices of the Standard Varnish Works will remain in New York City. The products of the company are manufactured in plants located at Elm Park, New York; Chicago, Ill.; London, Eng.; Paris, France; Berlin, Ger.; Milan, Italy; Barcelona, Spain; and their newly completed lacquer factory at Linden, N. J.

# Conditions For Lower Costs

*Industrial Engineer explains how even slight differences in variety and condition of lumber, and the machine work on lumber, exert a powerful influence on results and relative costs in the finishing room*

By Chas. F. Scribner

FINISHING FOREMEN are between three fires when a program of cost reduction is introduced into any plant. First, the purchasing agent tries to make a good showing in his department, at times being inclined to buy on a price basis without full consideration as to the effect of such materials on production cost. Second, the machine and cabinet department foremen try to "get by" with their work in order to make a record in their departments, and, finally, the salesmen are constantly telling about the strong competition and how they "cannot see why your finishing costs should be more than the other fellow's."

Between these three forces the factory manager and his finishing foreman find their hands full in keeping quality up to a high standard, and bringing costs down below previous figures. There are, however, a number of features which, if given sufficient attention will not increase costs in other departments, at the same time help greatly in securing lower finishing costs. Some of these are well known to most finishers, while others can profitably receive more attention than they have in the past.

**Materials to be Finished Vary**

The right conditioning of products for lowest finishing cost starts with purchase of the raw material. In the matter of lumber, probably every finishing foreman has noted a decided difference in the treatment required to get a satisfactory finish on oak grown in low, swampy sections after operating some time on oak which has been cut in the mountains. The change in material makes necessary a new and unusual treatment and, to a certain extent, upsets the routine operation of the finishing department.

Of oak used in furniture and chair manufacture there are two kinds, white oak and red oak. White oak is dense, hard, heavy, durable and strong and requires a very definite treatment in finishing to produce satisfactory results. Red oak is not so hard and dense; it is more porous and requires a different treatment to secure the same finished result. If first one kind is purchased and then the other, a large amount of time is wasted in finishing operations before the work is satisfactory. This time can be saved by standardizing on one or the other, and then securing dependable sources of supply.

Similarly with gum, which is so largely used in furniture construction. Of the several species may be mentioned red gum, black gum, cotton gum and water gum. Each of these has certain qualities that call for specific treatment. Red gum is now used to a larger extent than any of the others. When black or water

gum, with their closely interlocked structure are used, finishing difficulties are immediately presented to workers who are accustomed to finishing red gum. These difficulties arise not only from lighter color of the wood, but from the increased density of its structure.

A table, which has been worked out and applied in several plants to show the characteristics of several of the woods most commonly used for finish treatment, appears in Fig. 1. It will be of value to foremen who want to know what they have to contend with in the products coming to their departments and it will save considerable experimenting and consequent increased department cost.

| Wood | Radial Hardness | Characteristics |
|---|---|---|
| Oak, White | 1163 | Hard, dense, heavy and strong. Somewhat difficult to season. |
| Oak, Red | 1020 | More porous, less dense and harder than white oak. Easily kiln-dried. |
| Gum, Red | 652 | Uniform texture. Easily kiln-dried under right conditions. |
| Gum, Black | 666 | Fibers closely locked. Color of wood varies with different species. |
| Maple | 918 | Different treatment for hard and red maple. |
| Chestnut | 674 | Light, durable, very porous, easily seasoned. Attractive grain. |
| Birch | 768 | Variation in color due to sap and heartwood. Uniform texture. |
| Basswood | 226 | Very little figure, little warping, soft. Variation in color. |
| Poplar | 347 | Light, soft, straight grain. Kiln-dries well. Takes good finish. |
| Hickory | 982 | Strong, tough. Little used where finish is of major importance. |
| Ash | 1000 | Strong, tough, elastic. Natural or painted finish usual. |

**Table revealing relative hardness and characteristics of various woods.**

### Dry Lumber Important

Another place where purchasing plays an important part in costs is in providing an ample supply of lumber which has been properly air dried. Recently the writer observed some large tables which had been made from oak only 30 days from the saw. This lumber was run through the dry kiln and immediately worked into the finished product. As it was not properly seasoned, the finish, within three months, proved defective and cracks appeared at supposedly glued joints into which a lead pencil could be inserted.

Lumber for products which are to have a high-grade finish must be seasoned for a time in the air, properly kiln-dried, then allowed to season in the cooling shed before being brought to the machining operations. When this practice is followed the cost of finishing is reduced and the quality of finished product is much higher than is otherwise the case.

While it is true that the dry kiln will quickly produce lumber with the right moisture content, still the effect of air-drying and properly seasoning to withstand atmospheric changes should be given careful consideration, if a high-quality finish is required.

### Too Much Experiment

One other feature in purchasing which gives the finishing

room considerable trouble is the constant experimenting which results from an over-zealous desire to reduce finishing material costs. Fully appreciating the need for constant experiment and research to find ways by which costs may be reduced, the writer wishes to point out that the primary objective of the finishing room is profitable production, hence there is nothing gained in turning the entire finishing room into an experimental department, as is often done.

Experimenting should be done on a small scale, without disrupting the production program. Then when the effects of such experiments have been proven they can be applied to the entire department without increasing costs.

### The Quality of Sanding

In work coming from the cabinet department trouble is often encountered from using sanding materials which do not cut the loose fibers of the wood but which simply press them down into the softer surface. When the stain coat is applied these loose fibers come up and form anything but the right kind of a surface for finishing operations.

This condition can be corrected by using sandpaper of the very best grade and the proper degree of fineness, then never using it when it has ceased to cut properly.

Especially after sponging of drawer fronts, case and table tops, and all pieces having a large surface, must care be taken to see that the sandpaper has the proper cutting qualities. Neglect of this point only throws additional work on the later finishing operations and increases finishing department cost.

### Patching in the White

Satisfactory sanding of all surfaces and "patching" of all defects should be done in the cabinet department before the work enters the finishing room. Patches must be applied so they will not break down under water and oil stain. Where putty is used for any purpose it must be of a kind that will take color in staining of the work. If this is not given attention the repairs made will show up too plainly after the final finishing.

### Faulty Machine Work

In the machine room there are two conditions which cause added cost not only in the finishing room but in the cabinet department as well. These are: Improper surfacing at machine operations, and torn and broken corners where cuts are made cross-wise of the grain of the wood.

Perhaps the greatest source of trouble with which the finishing department has to contend is the rippled or wash-board surfaces produced by machine-cutting and not fully corrected by machine sanding then attempts are made to improve the surfaces by hand sanding. As is always the case where defective work is not corrected at the source, this causes a great deal of extra work in finishing—work which is eliminated when each department does its share in producing surfaces which are in best condition for the finishing operations.

### The Final Sanding

In many furniture plants it is common practice to sand the work after each coat of finishing material. The experience of a number of progressive plants, making quality products, proves that this is not necessary to se-

cure a satisfactory finish, provided the first building coat has been properly applied and surfaces are properly sanded before finishing operations start.

Some simple experiments along this line by finishing foremen, on their own work, will convince them that their finishing costs can be reduced in this respect, without in any way sacrificing the quality of the product they turn out.

## Pyroxylin Enamel

White wood lacquer or pyroxylin enamel, will, I believe, replace the oil enamels, because of its many desirable features. Comparatively speaking, age does not discolor it. Repeated wiping will not dull the surface but on the contrary, wiping brings up a high luster, making this material a very good finish for trim in hospitals, restaurants, barber shops, or for any surfaces to be enameled. It gives that solid porcelain effect that cannot be obtained in any other air-drying material that I know of.

Finger marks, grime, etc., can be easily removed with furniture polish, or a neutral soap and water. The use of this material speeds up production in the finishing department and reduces to hours the drying time which, under the old system, required days and weeks before the work was dry enough for shipment. In the packing department also it holds down costs, since it will not paper-mark, nor will it mar or bruise easily.

Such preparatory work as straining material, breaking in brushes, dust-proofing the room, placing trestles for flowing, and the immense amount of handling and room required—all this is entirely eliminated.

To produce a successful finish with white wood lacquer, it is essential to use a pyroxylin undercoat, unless some specially-made oil undercoat is recommended by the makers of the enamel. Care should be exercised in selecting an undercoat, since the undercoat should contain sufficient active pigment to produce a perfectly white opaque surface, because in this day and age finish departments are limited to a specified number of coats on their work, and every foreman has to contend with the problem of speed and results.

After a wide variety of experience along this line it is my opinion that pyroxylin undercoat should be used with pyroxylin enamel, and that to use oil undercoat is only to invite grief, delays and trouble.—Edward C. H. Rottmann.

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When applying finish to any surface, extreme care must be taken to see that each coat goes on smoothly and free from dirt, sags, skipped places and other defects. There is quite a knack in putting on each coat of material heavily enough so it will flow or level out to a smooth surface, but not so heavily as to cause runs or sags. Considerable experience is necessary to properly rub down or surface the various coatings.

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### *Maynard Joins Miner Edgar Co.*

H. E. Maynard has become associated with the Miner Edgar Co. of New York as sales manager of the lacquer department. This company, which is one of the largest manufacturers of base solutions and solvents in the U. S., recently started this department.

Mr. Maynard has been connected with the plating and lacquering industries for the past 20 years.

# Dip, Drain and Carrier System

*Describing an economical but efficient installation for dip coating, draining and transferring parts, assembled units and complete pieces of low-priced wood furniture*

By F. W. Worthington

THE installation about to be described extends around the four sides of a room 60x103-ft. on the third floor of a well lighted and modernly constructed factory building. It is designed to take care of the two dipped coats on porch furniture, in dull golden oak, and juvenile furniture in white enamel. The stain dip tank and drain board are also employed to stain a line of low-priced tables and telephone stands, which later are filled and given two coats of varnish at spray booths in an adjoining room.

### Portable Tanks Used

With these requirements in mind, the superintendent selected, built and installed equipment for economical production along a route which extends in a continuous line around the room. The dip tank, drain board and catch basin equipment includes five tanks and four sheet-metal drain boards, each of which is mounted on a portable stand built of wood framing, and fitted with swivel castors.

The depth of the dip tanks plus the height of the stands which support them, is such that the top edges of tanks are about 33-in. above the floor—a convenient height for workmen. The size of the tanks, of course, is governed first by the size of the largest pieces to be dipped, and second by the volume of production. In this case the size of the largest assembled parts to be dipped was the governing factor.

The two tanks for stain and varnish are the largest, each one being 12-in. deep, 32-in. wide and 6-ft. 6-in. long. An extra tank, used only when two drain boards are placed in tandem to catch varnish drippings, is 14x14x30-in.

A round bottom dip tank, used interchangeably for white first-coater and white enamel, is 13-in. deep, 18-in. wide and 4-ft. long—a size suitable for the largest pieces of juvenile furniture. A small flat bottom tank is sometimes employed as a container for blue enamel to blue coat the feet of some of the juvenile pieces.

Material is never allowed to stand idle in the smaller tanks. When dipping ceases, the remaining liquid is poured back into containers where it can be preserved air tight. In the two large tanks, however, it is necessary to allow the material to stand idle between periods of productive activity. This idle material in each tank is kept air tight by lowering the heavy sheet metal cover so its projecting rim rests in the water-jacketed channel around the flanged top edge of the tank sides.

### The Drain Boards

The drain boards, most of which are shaped like huge shallow gutters, are wood framed and metal covered. They are wide enough to catch drippings from dipped woodwork hung above them, and in length they range

from 11 to 16-ft. Their slope is from 5 to 8-in. in 12-ft. The thicker and heavier the liquid, the more the degree of slope necessary to properly drain it so it will flow back into the tank. Varnish and enamel drain boards need more slope than the drain boards for water stains.

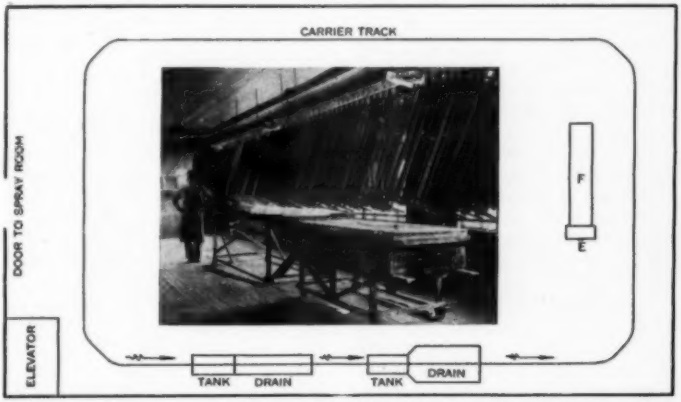
The lower end of each drain has a projecting lip which overhangs and barely clears the edge of the dip tank.

ily rise to quite an elevation at the high end.

**The Track and Carriers**

The plan of the overhead carrier track appears in the accompanying illustration. The insert shows some loaded carriers, with a typical drain board and dip tank below. Regular door carrier equipment is used, and the track is placed as high as 12-in. beams under a 10-ft. ceiling will allow.

From each two-wheel trolley




**Plan of carrier track and usual location of dip tanks and drain boards. Insert shows picture of a typical dip tank and drain board with loaded carriers above.**

In mounting a drain board, the height of the dip tank or catch basin governs the height of the low end. From this point the drain must slope upward, but it must not rise so high as to interfere with the progress of the lowest hanging pieces which travel above it on carriers. This explains why it is sometimes necessary to arrange, in tandem, two short drains of equal height (one draining in the dip tank and the other to a small catch basin or drip tank) instead of using one long drain which would necessar-

there hangs a wrought iron bar $\frac{3}{8}$x1¼x24-in.; each bar contains small holes spaced about 3-in. apart. One of these bars extends through a slot near the end of each wood carrier. A pin, pushed through a hole in each iron rod holds in mid air the wood carrier, with its iron hooks along the lower edge and its iron pegs on both sides.

The several holes in the iron bars provide height adjustment for the wood carriers, to suit different size material. Each wood carrier is a straight pine 2x4-in.

piece, 12-ft. long with wide reinforced bumpers at both ends, so that one carrier will push another ahead of it along a straight stretch of track.

**How Operations Proceed**

The material is dipped and hung up by hand. When one carrier has been loaded, it is moved forward to make room for another. Being portable, the dip tanks and their drain boards can be located to suit the nature of the work and the line of production. It is customary, however, to locate the staining equipment near the elevator on which material comes up from the woodworking departments, and to place the varnish dipping equipment farther forward, as shown in the plan view. By the time the parts for k.d. porch furniture reach the other side of the room, they are ready to be taken off the carriers and packed for shipment.

When putting through a run of juvenile furniture or anything requiring one or more dip coats in color, the dip tank and drain marked E, F, are placed under the carrier track and operations proceed in the same way as staining and varnishing.

## Shellacing Knots

The shellacing of knots and defective spots on the exteriors of buildings is still adhered to by some old-fashioned painters in the old, wrong manner and that is, shellac is applied directly on the bare wood which generally contains moisture. This results in the shellac and subsequent coatings being pushed off the surface, showing every spot where shellac has been applied.

All such spots also show darker in a very short time. This is particularly noticeable on calcimined or flat-coated interior surfaces or where cracks have been shellaced to prevent absorption.

The proper way of shellacing knots is not to shellac them at all, but to use a proper sizing material, or if the painter still insists on doing what his grandfather did, he should apply the shellac after the priming coat. He will be better able to notice all spots in need of treatment and moisture will have less effect on it, resulting in a more permanent job and otherwise more satisfactory results.—G. W.

## Non-Chalking Lacquer

A great improvement that is being attained in lacquers today is the non-chalking result. Some of the first lacquers, and some of those that are still being produced for the market today, have a tendency to chalk. You could wipe your hands over the materials that go on the automobile body and wipe the color off.

That may not be a serious thing, although it would indicate that there was some perishing going on. It is serious from the standpoint that the average owner, when he polishes his car and takes the polishing rag and washes off a coat of blue or red or whatever it may be, immediately gets scared and is afraid that the job is going to pieces. Non-chalking colors of the enamel type are being made today.

### *Engineering Bulletin Ready*

The Binks Spray Equipment Co., 3114 Carroll Ave., Chicago, Ill., announces as ready for distribution its new Bulletin No. 30, covering Binks latest engineering developments for finishing departments where lacquers, varnishes, enamels and paints are applied.

# Lacquer in Metal Finishing

*The selection of lacquers for different metals, containers for lacquers, and methods of lacquer application and drying—all these have an important influence on the final results*

By Robt. L. Kent

THE MOST efficient method of applying lacquer to metal surfaces, both from the production standpoint and that of quality finish, is by means of a spray gun. However, this holds true only in the larger items. On small items the most efficient and economical method of application is by dipping. When this is done the articles to be lacquered are strung on a wire, dipped and hung up to dry.

The best method of applying lacquer to very small articles is by dipping in a wire mesh basket and then spreading the pieces out on glazed paper to dry. The brush method in the application of lacquers, although still in use in some plants, has little to recommend it. Brushing is slow and much more difficult than either of the two methods above mentioned. It is not economical because it slows production and does not add to the quality of the work.

The appearance and quality of the finished products determine their salability, and here is where the finishing room comes in. The finish is what first catches the eye of the prospective purchaser, and in nine cases out of ten it is what sells the product. The quality of the finish, however, goes deeper than mere surface appearance. After all the final test of the finish lies in its wearing qualities; this is just as true and just as important in lacquered products as in varnished articles, whether they are made of metal or wood.

### Lacquer Quality Important

With the above facts in mind, the reason why the best lacquers are the only kind that should be used is evident. A cheap lacquer is never worth while. Quality is necessarily a minus quantity where cheap lacquer is used. The cost of lacquer per unit finished is comparatively such a small part of the complete cost that it is not worth while to use inferior lacquers.

There are many other reasons why the best quality lacquer should be used in metal finishing, a few of which are its adhesive qualities, durability, freedom from blushing and blooming, and ease of application, the latter being particularly important, as this is a vital factor in production.

### Cleaning and Drying

Unlike wood, metal needs no preparation other than a thorough chemical cleaning before the application of suitable lacquer, unless the metal is in the form of castings or has surfaces that need to be filled to produce a smooth final finish. A little care exercised in thoroughly cleaning the surface to be lacquered, is time well spent because it means a satisfactory finish. Lacquer thinner is an excellent cleaner, quickly removing any buffing dirt.

Many of the finishing troubles in metal lacquering are the result

of unclean work, although some, such as green and brown stains on brass and bronze, are very often due to the acid conditions of the lacquer—the result of particles of the metal in the lacquer corroding.

Special drying facilities are generally unnecessary to get best results with lacquer, although some lacquer finishes can be dried at temperatures up to 150-degs. In the drying of lacquer on certain metals correct temperature is of the utmost importance. Silvered and white enameled articles will become discolored if too much heat is applied, and these two finishes, in particular, should be air dried.

I have emphasized the need for the best lacquers in turning out quality finish, but there is another consideration equally as important. It is the selection of the right kind of lacquer for the particular metal to be finished. There are special lacquers for steel, iron, brass, copper and precious metals, such as gold and silver. In some cases one lacquer may be used for several kinds of metals. Silver, however, always requires a special lacquer.

**Lacquer Containers**

Another thing of considerable importance in the finishing room is the right type of container for the lacquer. Glass tanks and stone jars are desirable for use as containers for silver lacquers. An improper container is often the cause of defective work. Containers are comparatively inexpensive, and it is indeed a poor concern that will not exercise a little care in this respect. Under no circumstances should lacquer be kept in copper, zinc or lead cans, although tin cans, soldered with tin, may be used for ordinary work.

Considerable trouble is experienced in lacquering brass work which has been soldered and acid dipped. Here again much of the trouble may be eliminated by using the right kind of containers. In the first place lacquer for this kind of work should be put in as small a dip tank as possible. Unused lacquer, at the end of the day, should be poured back after careful filtering through cheesecloth.

## Brushable Lacquers

Lacquers have recently appeared on the market designed for brush application. This will make lacquer available to small users, housewives, etc., who could not have considered its application by mechanical means. The apparent obstacle in the way of its development have been largely overcome, and it is now possible to obtain lacquers which not only have enough flow to leave a smooth surface, but which also have that property which permits successive coats to be applied without damage to the preceding coat of similar material.

Although there will probably, in the aggregate, be a wide demand for brush lacquer, it is my opinion that mechanical application has advantages in the industrial field which will restrict the use of brush lacquer to non-industrial application.—Arthur Orr, at Tenth Exposition of Chemical Industries.

## New Multiplehead Airbrush

The new Multiplehead Airbrush, illustrated herewith in various positions for work under different conditions, represents one of the latest developments of the Paasche Airbrush Company, 1921 Diversey Parkway, Chicago, Illinois. The multiplehead is said

Views of spray gun and different connections to the supply of material.

to be a "completely interchangeable, quick detachable, combination round, revolving, floating and adjustable fan spray airbrush, with a range of five airbrushes in one."

The new spray gun is suited for spraying liquid materials "from the lightest to the heaviest, coarse or fine, hot or cold, with a crescent-shaped fan producing air ports harmonizing and balancing perfectly with a round air cone of the air cap." It floats into perfect alignment with the fluid valve plunger, thereby preventing leakage of paint or uneven spraying.

It gives a range from the strong jet of clean, compressed air used for dusting off before painting, to a fine line graduating into a smooth wide fan spray, 12 to 16 inches in width. The operator, by one touch of the trigger, can finish surfaces ranging from the smallest to the largest, and do his work rapidly, smoothly and economically.

### *A. M. Kittredge, President of K. & S., Dies*

While eating Thanksgiving dinner at the home of his son, Harvey, Arthur M. Kittredge, President of the Kay & Ess Co., Dayton, Ohio, died suddenly. Up until the time of his death Mr. Kittredge had been enjoying his usual good health.

Mr. Kittredge was one of Dayton's foremost men, not only in the business sense, but also in his religious work and in his contributions to various civic movements. He was born Jan. 9, 1854, and spent all of his life, excepting four years, in Dayton.

Mr. Kittredge was a self-made man, having advanced gradually to his place of wealth and influence. Since 1900 he had been president of the Kay & Ess Co. Three children survive: Miss Helen Kittredge, Mrs. T. J. Watson, of Short Hills, N. J., and Harvey G. Kittredge.

### *Adams & Elting Advance Pattou*

The Adams & Elting Co., Chicago, Illinois, announce the appointment of Mr. A. B. Pattou as Industrial Sales Manager. Mr. Pattou has been with the company twelve years and before the war was salesman for the Indiana territory.

Mr. Pattou is especially enthusiastic over the new Adelite line of Odorless Lacquer Enamels for refrigerators and kitchen cabinets, which he has been instrumental in developing.

# Violin Finishing

***Suggestions relating to the finishing of violins, and the requirements of finishes used; also formulas for violin varnishes in yellow, red and intermediate shades***

By A. Ashmun Kelly

A VIOLIN authority tells us that "more books have been written on the subject of (violin) varnish, and more arguments entered into, and more claims advanced on the varnish question, than on any one item of violin making." While this may not be precisely true, there has been considerable argument over the matter of ancient violin staining and finishing, and almost periodically some one comes out with the discovery of a formula that the Cremona artists used in making their varnish.

**Varnish Influences Tonal Quality**

Violin makers, I believe, agree that the quality or character of the varnish has much to do with the tonal quality of a violin. We know this is true, and from this basis we conclude that ancient Italian makers paid great attention to the preparation of their finishes. And it is around this point that all the argument revolves; what kind of varnish did the Cremona violin makers use? This is the great unsolved and unsolvable mystery, so we say.

One formula calls for amber, linseed oil and spirits of turpentine. This varnish may be tried by using the following small-quantity formula: Dissolve 2 oz. of amber in 5 oz. of raw linseed oil, and after the gum has dissolved take from the stove and add 5 oz. of turpentine spirits. You may color this any desired tint, for a yellow using tumeric. Any of the following vegetable dyes will be found useful for a yellow: Gamboge, saffron, Cape aloes, and sandarach. For a red use one of the following dyes: Dragon's blood, annotta and red saunders.

Shades may be made from an intermixture of the red and yellow, varying the amount of each according to the shade or color desired. One way which is used for coloring, is to first apply a yellow and, when dry, overlay it with a red; the red must be brushed on in such manner as to produce the mottling and shading which is seen in so many violins.

For another varnish I submit the following formula:

| | |
|---|---|
| Gum mastic | 1 dr. |
| Gum sandarach | 1 dr. |
| Gum shellac | 6½ dr. |
| Alcohol | 5 fl. oz. |

It is not claimed by any one, I believe, that such formulas represent the materials used by the ancient violin makers, but what is more to the point, these varnishes will give satisfactory results to our present day workmen.

**Old Methods Still a Mystery**

We know nothing as to how ancient violin makers treated the raw wood, or the finished product, and it is for this very reason, I suppose, that the mystery of their workmanship and materials is so interesting. We do not know whether they stained their varnish, or whether they stained the raw wood. And here is where most of those persons interested fail to consider that time is a factor. Time colors

many exposed objects, such as finished woodwork. Take our instruments of today, and let them have a century of time-staining, and it is absolutely certain that they would show as fine a coloring as any real old Strad. in existence. But this is, of course, impossible of actual demonstration.

Newly varnished violins hanging up to dry.

Expert violin makers say that it is well to stain a violin before varnishing it. At least many prefer and employ this method. I have somewhere read that, "staining should always precede varnishing." But perhaps this rule is like others, subject to exceptions.

### A German Method of Finishing

The German method is to first stain the wood. Most of our cheap violins have come from Germany, and at present many more than ever. Here is a sample formula for the varnish used:

| | |
|---|---|
| Gum sandarach | 4 parts |
| Gum shellac | 2 parts |
| Gum mastic | 1 part |
| Benzoes resin | 2 parts |
| Venice turpentine | 2 parts |
| Alcohol | 32 parts |

The gums are dissolved in the alcohol in the usual manner, then the Venice turpentine is added; the mass is then filtered, to remove the undissolved gum.

Always a clean brush is required for applying the varnish. They use Campeachy wood for staining, with one-fourth as much yellow dye-wood; adding five times the weight of the dyes with boiling water, and boiling for two hours in a copper vessel, though an earthenware vessel does as well. Iron would discolor the dye.

It is interesting to note, as previously pointed out, that the Germans first stain the wood. Such violins as I have seen of German make and of recent importation, are of a uniform yellowish cast, without any mottle at all. This does not give as attractive an appearance to the instrument as when there is a dark mottling.

### Characteristics of Suitable Varnish

An authority on violins says that, "A varnish that is soft, elastic and velvety to the touch is one which allows perfect freedom to the vibrations whereas, a stiff, hard varnish impairs tone." I recall a criticism that one of my articles on this subject, some years ago, elicited from a writer in a music magazine. I had advocated the right kind of varnish, and that the best, in order to give good tonal qualities.

My critic stated that the old Cremona violin makers used fine varnish and also rosin varnish as well, and that there was no difference in the quality of the instruments done with the two. This is not true, of course, nor could it be. He suggested that they probably used what they could procure in the way of varnish materials from their own neighborhood, regardless of what it might be. We know that they gathered their wood material from their own neighborhood, for

nowhere else could as suitable woods be found.

I read somewhere a curious thing; it was stated that the workshop in which Stradivarious, the king of them all, did his varnishing, was kept hot while varnishing was under way, and that the gummy fluid fairly sizzled under the brush! This cannot be true, and yet I cannot show that it is not. The only advantage, if it might be called such, that a hot application would have over a cold one, would consist in its greater penetration.

The following formula was announced through the press as a rediscovery of the ancient formula, but no one needs accept it as being so:

| | |
|---|---|
| Gum sandarach | 6 oz. |
| Gum mastic | 3 oz. |
| Restified alcohol | ½ gal. |
| Turpentine varnish | ½ pt. |

These ingredients are to be placed in a tin can and left in a warm place, say near a stove, but not too near a fire. Now and then shake the mass slightly to hasten dissolution of the gum; this accomplished, strain and bottle for use. If upon cooling the varnish appears too heavy it may be reduced with turpentine varnish.

The following is given as a good formula for a red varnish:

| | |
|---|---|
| Gum sandarach | 12 oz. |
| Gum mastic | 6 oz. |
| Gum shellac | 6 oz. |
| Gum elemi | 5 oz. |

Reduce the gums with 95 per cent alcohol, but first add any desired coloring to the alcohol. Then take 12 lbs. of the alcohol and add the gums to it; when these have dissolved add 6 oz. of Venice turpentine. This is a very inflammable varnish, hence care must be taken to avoid having a fire or light too near it.

A soft varnish, either in oil or alcohol, is more costly to make than any others, because only the best selected and most expensive gums can be used. The advantage of a spirit varnish is its more rapid drying and hardening, as compared with an oil varnish, but it is considered that the oil varnish is the best of the two in all other respects. It is harder to keep in condition as to luster, than the spirit-varnished violin, but we are disposed not to complain of it when we reflect that the tone quality of the instrument is the better for the oil varnish.

### Finished Appearance Exercises Influence

The appearance of a violin is influenced largely by the kind of varnish employed in its finish, and the connoisseur will always select the finish that has the soft, velvety effect such as either spirit or oil varnish may impart, rather than that which is of a hard glassy appearance. As to color, the delicate shading with the dark red on a ground of soft yellow, skillfully done, is preferable to the finish I have described as being on cheap German "fiddles."

As to whether it is best to apply the stain and varnish at once after the instrument is made, is open to question. Some think that by allowing the wood to have some time for exposure to the air, this ageing in the white will improve the effect. This is probably true, but as it requires months to get out a high-price violin, it is unlikely that the instrument would be permitted to lie in idleness several more months before being finished. The wood is perfectly dry before the workman begins using it, and it remains dry during the manufacturing process.

# Toy Furniture Finishing

*Describing how paint shop problems, involved in the production of white-enameled toy kitchen cabinets, have been solved in an eastern factory*

By A. J. Daniels

THE HEART of a toy factory is its paint room. Few men who have had any experience in the manufacture of toys, either wooden or metal, will dispute this statement. The difference between a good year and a poor year in the toy business is always simply a matter of production. And a poorly conducted paint room is the greatest single obstacle to production.

Wet lumber, machinery breakdowns, power troubles—even labor troubles—may at different times destroy the production schedule of a toy factory, but these are either occasional or seasonal halts. A day's lost time in the paint department, however, can cripple the output of a toy factory for weeks.

In our factory we have had our greatest trouble in procuring a suitable finish, and after we have procured the finish, in maintaining an uninterrupted flow of white enameled furniture from our paint room. We have tried every device and method possible but we still have our occasional upsets, and believe me they are costly ones.

### White Enamel Comes Back

When New York buyers first began to demand white enameled furniture again, after a doldrum of several years for this particular toy finish, we resumed where we had left off when we abandoned its manufacture 20 years ago. We resurrected our old dipping tanks and started production. Try as we would, we could not obtain a finish that suited the New York office. Then we tried brushing. Dipping was a cheaper process and a faster one, but we found it practically impossible to obtain a finish without runs and sags.

The brush method proved little better—and much slower. Toys, in the last analysis, are cheap things — cheaply produced — and, of course, to meet competition we had to employ girls to paint the furniture. Now I am willing to admit that most modern girls are adept painters, but not of toys. We abandoned the brush method and tried dipping the first coat and spraying the second coat. This worked better, but we finally had to abandon dipping altogether and adopt the method we are using successfully today.

### The Process Developed

Our present process is this: The cabinets, which form the bulk of our toy white furniture output, are assembled by girls before being painted. They are then taken to the paint room, which in our case is a unique structure. Some years ago we built a very big drykiln with a connecting alley running into our millroom. To save heat and at the same time save the expense of installing a separate paint drykiln, we built a paint room right on top of the roof of the lumber drykiln. This room is equipped with two spray booths and racks

enough to accommodate 1000 kitchen cabinets.

First the cabinets are thoroughly cleaned with a portable electric blower. They are then rough sanded by boys, who work piece work. The boys pile the cabinets behind the spray gun operators, each of whom has a boy tending bench for him. The tender (or helper) places two cabinets at a time on the pedestal of the sprayer, and the operator, without a lost motion, covers them with a heavy coat of first coater or primer.

We use an ordinary commercial primer. We formerly ground our own first coater, using zinc and whiting, but we have found the commercial article to be cheaper. The tender takes the first-coated cabinets from the pedestal and places two more on it. He then slides the painted toys onto a traveling rack. When the rack is filled—it holds 30 cabinets laid on their backs—it is pushed toward the back of the room.

### Output per Operator

A good operator will spray 500 cabinets in five hours. We start the spraying every morning with 500 first-coated cabinets ready. These are taken from the racks and sanded by hand, the only way we have found practical. Girls do this work. By noon the 500 first-coated cabinets are ready for enameling. Here again we use a very fine grade of commercial white enamel. We have had more trouble with enamel than any other material we use. Lately, we have been getting better results with an enamel that has a slightly bluish cast before drying.

A good operator will spray 500 cabinets with enamel in four hours. This leaves him with a clean floor and 500 primed cabinets to start on the following morning. Of course, there will be a few runs on some of the enameled cabinets; we have never found an operator who would not slip now and then, but we have very little trouble from this source. The rejects are sanded and finished again the same day.

We find that it requires a full 12 hours for both the priming and enameled coats to dry. If they are taken from the racks too green, the finish rolls up when they are handled. Other troubles we have found, arise from too much moisture in the air, resulting in a yellowish cast; too much heat, which causes small bubbles and peeling that may result from pitch in the wood; and oil spots caused by previous operations or non-absorbent knots. These are minor troubles and can be easily overcome.

### Cleanliness is Essential

A good sprayer is worth his weight in gold. For instance, we have one man who has been with us several years, and who has inaugurated a method of keeping his spray booth clean that is worth considerable to us. White furniture or toys cannot be produced unless the surroundings in the paint room are spotless. This operator takes care of both booths. Every Saturday he has them both scraped clean, even the fans and outlet pipes. He then lines each hood with heavy trans-

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mission or cup grease, spread on thickly. Over this he places a lining of kraft paper.

From Saturday noon until Monday morning the paper absorbs a great deal of the grease and, when the sprayers start, the surplus paint slides from the paper into the overflow tank. In consequence, the operator is able to throw the paper away Wednesday, replace it, and continue until Saturday without further cleaning his booth.

Every operation in the production of a toy in our plant, with the exception of a few in the millroom, is paid for at piece rates. We find this method works out well in the paint room. Operators are better satisfied and we get a better volume of production. Paint manufacturers have shown real willingness to co-operate with us, and their assistance has enabled us to put white toy furniture through the shop with two coats—a primer and a finish coat. There is still something to be desired in the covering qualities of all the first coats we have tried, but they are better today than they were.

### The Ultimate Ideal

If we could get a first coater that would really cover and dry hard to the touch in five hours at 110-degs., and an enamel that would dry roll-proof in ten hours, and still shine, we would be willing to admit the ultimate. There is no such animal; at least, our extensive search has not revealed it so far. Some day, sometime, someone will find it, but until then the chief worry of toy shop executives will continue to be production, and the chief obstacle to production will continue to be —the paint room.

## Machine and Hand Rubbing

Some expert workmen agree that the modern rubbing machine does as good work as is done by hand; other experts vote the other way. As a matter of fact the rubbing machine is very human, in that it will do good work or poor work depending upon the way it is handled. The fact that most of the finish rubbing is now done by machine (in our land at least) should count for something.

Naturally machine rubbing is more economical than hand labor, yet the human factor must still be counted in. It is still necessary to hand-rub around corners, ends, and certain other places where the machine cannot work, or rather where it possibly could work, but where it might damage the finish.

The place where the rubbing machine is at its best is on the broad, flat surfaces. An expert workman can hand-rub the smaller parts, the mouldings, edges, etc., just as well as to turn the machine around that way, but he must be given a lot of time, and he must be an expert.

Experts are scarce. This is one reason why the machine is a boon to the industry. It does not require such an expert finisher to operate it. Another good point is that the machine requires much less room in the shop than ordinarily would be allowed for the number of men who could do equally as much rubbing in a day.

### Surface Important Condition

However, let us examine some of its weak points, as well as its good ones. The surface to be rubbed must be in good shape for best results. If it is not in the very best of condition for rubbing—if it is uneven or warped, or what not—the machine is

likely to cut through. Indeed, it is practically impossible for a machine to meet such a condition satisfactorily. The human brain, directing the hand alone can do it.

As the operator's fingers pass over the varnished surface, with a hand pad, he discovers the least unevenness or "fault" on the surface, and he discerns what area it covers. Then he can meet the condition intelligently and correct it. How shall a machine discover when it comes, say to a place where the varnish is on rather heavier than elsewhere on the surface? How can the rubbing machine discover whether or not the surface is sufficiently dry, without badly damaging it?

We are told that the machine, carefully handled, will do this very thing and succeed in rubbing a tender part, or a whole surface for that matter, as well as the human hand. Yes, it seems to be the consensus of opinion among the expert workmen that just as good work can be done by the machine as by hand, provided that extreme care and skill direct its movements. Also that the right machine must be used for the particular purpose. At the same time it is as generally admitted that where the surface is not in the best condition the machine is not likely to produce the best results.

**Great Difference in Machines**

Different kinds and makes of rubbing machines are in use, one type using a long stroke and the other a short stroke. The principal difference between these two types is that the one is rigid, and the object to be rubbed is mounted in position on a movable table or carriage; the operating apparatus moves with varying degree of pressure back and forth over the surface to be rubbed.

Another type of machine is smaller, and is operated by the workman passing the rubbing pad, attached to an arm, over the surface of the object. The former operates with long back and forth strokes; the latter with shorter and more rapid strokes. There are also different makes of portable rubbing machines.

The final operation in finishing chairs—rubbing.

Each type of machine has its special advantages; in the smaller ones the principal merit is that smaller objects can be rubbed, and also surfaces that are slightly curved. On the other hand this type of machine creates more friction in the rubbing, and consequently more heating of the varnished surface. There is always a danger of caking or rubbing up of the varnish under the rubbing pad, even in hand work, but this is a matter that may be remedied by using more care in the application of coatings and in the matter of allowing more time for hardening.—A.A.K.

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Confidence in one's self is certainly desirable, in any field of endeavor.

## Interior Finishes Change

Interior finishes, as now used by painters, are entirely different from those in years gone by. Wall paper, particularly the cheaper kind, has received a set-back. Flat coatings, glazed and mottled effects are now in vogue, and without a doubt they are more pleasing, more artistic, more lasting and more sanitary. Enamels have also taken the place of formerly painted and grained finished interior trim and surfaces. There is no comparison between the modern and former homes of the average human being.

We have applied ourselves to a more artistic layout of homes, adapting modulated tints and shadings against the bizarre, frivolous and grotesque coloring schemes of former years.

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Lead Sulphite has its advantages in many compositions, particularly for industrial paints.

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Lithophone is of late origin and is considered the ideal medium for interior wall coatings.

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In the field of painting titonox of titanium oxide, the latest discovery, seems to have proved its value and, in connection with zinc, is gradually giving a pure lead composition the battle of its life.

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Silex, ground crystal quartz, asbestine and others have been found to be necessary in some paint compounds, and are employed individually or in connection with other fillers or reducers, such as clays, chalks, barites, etc., which were used at an earlier period. Coloring matters, as now employed and produced with the aid of chemistry, are entirely different from those used in years gone by. Permanent chemical coloring matter, including anilines, enter into the production of stainers with apparently no harmful results.

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We should respect the good name of other people and should safeguard our own by a high sense of honor.

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### *New Du Pont Appointment*

William M. Zintl, of the Advertising Sales Department of the Curtis Publishing Co., has been appointed Director of Sales of the Paint and Varnish Division of the Paint, Lacquer and Chemicals Department of E. I. du Pont de Nemours & Co. He will assume his new duties shortly.

Mr. Zintl began his business career with Harrison Brothers Co., Inc., of Philadelphia, which was one of the best known and oldest established paint manufacturing concerns in the U. S. It was taken over in 1917 by the du Pont Co. when this latter organization entered the paint manufacturing field.

Mr. Zintl began as office boy in 1902 and was successively promoted until he became advertising manager. In 1910 he became Manager of Sales of the New York Branch of John Lucas and Co., Inc., which position he held from 1910 to 1912. He was New England Division Manager for the Lucas Co., from 1912 to 1915 and did sales and advertising work at the home office in Philadelphia for the same concern from 1915 to 1919.

In 1919 he joined the staff of the Curtis Publishing Co., and was district manager for the Philadelphia and Southern territory of the Advertising Sales Department at the time of his appointment by the du Pont Co.

Mr. Zintl is widely known in the paint and varnish field and is especially familiar with its sales and advertising problems.

**AUTO LACQUERS**

**Contains no gum whatsoever.**

*We have made lacquers for all finishes since 1857*

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# Industrial Finishing

PRACTICAL PUBLICATIONS, Inc.
Publishers
Room 603, 222 E. Ohio St.
Indianapolis, Ind

Issued monthly. Distributed exclusively to executives and foremen finishers in all kinds of industrial plants where finish coats are applied.

DECEMBER, 1925


### *New Auto Color Plans*

At the Twenty-first Annual Exhibit of fine cars in New York City last month the painting was an element of special interest. Some builders have departed from the duotone painting that has been in vogue for several years. On some bodies the placing of the colors likewise is unusual.

A most elaborate color study and development was carried out during the past year by Lincoln's research department. At the exhibit the results were seen on the work of various custom builders who showed a total of 12 Lincoln bodies—the limit set by the Salon management for any one make of chassis.

This color development is based on a study of American and other tropical birds. Certain of these beautiful colors and combinations have been selected, and are transposed to the cars, with due consideration to their disposition on the birds. For example, a Holbrook cabriolet was decorated after the inspiration from the Gold-Headed trogon of Ecquador.

The golden-green head, wings and back of metallic shades of green, and breast of scarlet, are interpreted in the motor car in bronze green on the forward portion of the car and the wheels; that part of the body to the rear of the coupe pillar is of darker green with a suggestion of blue; striping is in scarlet.

The majority of the body finishes were high-luster varnish, with a liberal sprinkling of oil-finish jobs. Lacquer also was represented; Marmon, which was the first to have a lacquer-finish body in the Salon, two years ago, is again the most prominent exponent of the nitro-cellulose method.

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### *Spray System Progress*

The past year has witnessed further advancement in the development and extensive use of equipment for spraying all kinds of paint and finishing materials. The increased use and popularity of nitro-cellulose lacquers for finishing wood and metal products—especially for finishing and refinishing automobiles—has stimulated the sales of modern spraying equipment and all accessories that go with it.

Opposition to the spray system in factories has been effectively broken down, and now the spray system is in practically universal use wherever it is at all applicable to the work. As a rule, spray equipment is totally absent only in those factories where the entire line of products and all conditions are particularly favorable to dipping or flowing-on the finish, and in the few small establishments that haven't the little money needed to buy it.

Spray equipment, once introduced into a factory on trial, almost invariably stays and the

original installation is added to from time to time as its use is extended and as the plant capacity is increased.

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*Material Racks and Carriers*

There is evidence of a stimulated interest today in portable racks and carriers to assist in a better utilization of factory space, a more rapid application of finishing coats, and added convenience in the handling and moving of freshly-coated articles going through the modern paint and finishing rooms.

Probably the reason why more progress has not been made in the use of this type of equipment is because so much of it must be designed and built at the factories where it is used. It must fit in suitably with the building, the finishing room production facilities and methods, and the type of product manufactured.

The possibilities for effecting economies and for speeding up the work through the use of practical racks and carriers are so very great, and the cost of the investment is so very small, that the suggestion warrants special investigation by all those responsible for finishing room production.

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*Planning Buildings to Suit Equipment*

Many new factory buildings show evidence of having been planned by men who learned, during long experience in older buildings, the value of considering present and future needs. Equipment for modern manufacturing processes in certain lines cannot always be arranged to best advantage within four straight walls. The interests of economical production, safety and general convenience are of prime importance when factory floor plans are under consideration.

In this connection it is interesting to note that one of the latest features incorporated in some new buildings that have finishing departments, is an offset in what otherwise would be a straight wall. The offset, projecting outward from a straight wall, is made large enough to provide a recess for one or more spray booths.

The idea is to set the spray booth in a recessed space instead of out in the room where so much space goes to waste on each side of it and along the wall. With the spray booths back of the wall line instead of in front of it, material can move to and from them, along a passageway close up to the wall.

Another advantage in such a location is the matter of safety in case of fire. It permits the opening in the recess to be completely shut off from the finishing room by fireproof doors in case of fire, or at night and on Sundays and holidays.

---

Through the efforts of trade papers and other agencies such as the "Save the Surface" and the "Paint Up and Clean Up" campaigns of paint and varnish manufacturers and dealers, the public has awakened to the fact that money can be saved and appearances improved by keeping its automobiles, as well as its buildings, well painted and finished inside and outside. More cars are being refinished today than ever before, and the indications are that those in the refinishing business will have a promising future.

# Finishing Cast Iron Surfaces

***Cast iron surfaces may be finished in various ways to produce, in any desired color and lustre, that hard, durable, protective coating which is so much in demand today***

**By W. H. Martindale**

CAST IRON usually is quite rough and porous and if a smooth, level finish is desired on it, a surfacing operation of some kind must be employed. The proper surfacing system to be used depends a great deal upon the size and shape of the casting, the use to which it is to be put, and the amount of expense that can be allowed for this operation.

Some shops make a practice of buffing the casting to a smooth surface, with grinding wheels, especially on the face or portion of the casting exposed when in use. This process presents a surface that is not unlike a sheet steel surface, so far as finishing methods are concerned.

Other shops find it more advisable to use the grinding wheels only for grinding off the burrs or sharp projections caused by holes in the mold, or by the seam where two sections of the mold fit together. The main body of the casting is then surfaced with paint products.

### Fillers and Primers

If the ultimate finish is to be baked, the filler used for the surfacing should also be baked, using a temperature of little in excess of that to be used on the final coat, to insure complete drying of the film. Since this filler coat will be quite heavy in some spots, the baking operation should be continued until the filler is thoroughly dry in the deepest holes.

If the finishing coats are to be air-drying paints or enamels, either the baked filler or an air-drying filler can be used. The baked filler usually will adhere to the metal somewhat tighter than air-drying products, though reputable paint and varnish manufacturers can supply quite satisfactory air-drying products.

Where lacquer enamels are used for finishing coats, either a baked filler or an air-drying filler can be used, though in either case it must be so constructed as to withstand the action of lacquer solvents. Probably a baked filler is most satisfactory for this purpose. Fillers built on a nitrocellulose or lacquer base can also be used, although it is better to have a paint priming material next to the metal to insure better adhesion. In fact, a primer, either air-drying or baking, can be used under the filler on all work to good advantage, provided the article will stand this additional expense.

Iron fillers for use in surfacing cast iron are usually of a paste or semi-paste consistency, and can be applied over very rough parts with a knife, if the surface is flat, or with a piece of leather if the surface is irregular or curved. This presses the filler into the pores and the excess is wiped off at the time of application.

Another plan is to reduce the filler with turpentine or naphtha and apply it by spraying or by

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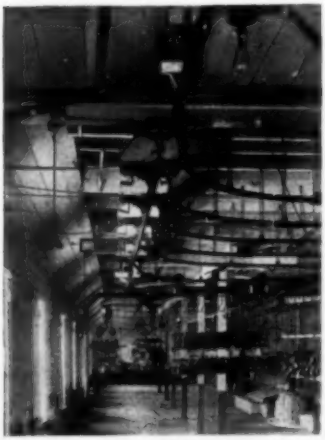
brushing. Sometimes it is advisable to use these different methods of application in conjunction with each other, such as spraying the entire surface and then "knifing" or "leathering" the rougher parts. One or two coats are usually sufficient.

### Must Sand Easily

Regardless of the method of application, when the filler is dry it must be sanded smooth. For this reason the filler should be so constructed as to sand easily —without gumming the sandpaper—and still leave a tough, hard, durable surface underneath.

After the filler has been surfaced, one or more coats of baking japan, baking enamel, air-drying enamel, paint or lacquer enamel may be applied by dipping, spraying or brushing, according to the type of material used, the size and shape of the casting, and other special conditions. These coats are applied and dried in much the same manner as on sheet steel or other surfaces.



Corner in metal-working factory equipped with system of overhead tracks and trolleys or carriers which are used to transfer parts to and from the paint room. Notice the curves, switches and control cords. This system keeps the parts clean and the floor remains clear.

### Finish on Bare Metal

For certain work it is not necessary to have the surface of the finished casting smooth. In this case the baking japan, enamel, paint or lacquer can be applied directly on the bare metal, using as many coats as may be required to get the desired finish.

A few precautions are in order. Castings usually contain considerable quantities of foundry sand. The castings should be rattled thoroughly, by knocking them together lightly, to shake out this sand before finishing operations begin. The surface must be thoroughly free of all oil, grease, dirt, acid or other contaminating materials before the first coat is applied.

Afterward, the castings are "pickled" in a weak solution of muriatic or hydrochloric acid, to remove all foreign materials and to give them a bright clean surface. If this method is used, great care must be taken to wash the casting free from all traces of acid before the paint coats are applied. Use clean water for this purpose.

Editor's Note: This article answers the request made by T.N.T. Co. in our Nov. "Questions and Answers."

---

The bleaching of discolored and dark woods is still done with the aid of oxalic and a few other acids or chemicals. Little progress has been made in this line lately, although a few special features have been developed to take care of special cases.

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# Questions and Answers

***This service department is conducted to meet the readers' need for prompt information on specific problems, and to give others an opportunity to review the questions and to offer comments, suggestions or answers***

## Mahogany-Birch Stain

Can you secure for us a formula for making in large quantities, a low-priced dark mahogany stain to be used on birch.—W.S.Co.

---

It will be possible for you to purchase oil soluble aniline colors and mix the stains yourself with solvent naptha, but it is a question whether, with the facilities you possess, you could make the stain any cheaper than you could buy it already mixed from a manufacturer.

Furthermore, aniline oil stains fade with outside exposure, and if economy is the object, a shellac substitute in which mahogany spirit stain has been dissolved would work out the cheapest as then you could wax direct without an extra coat, as would be necessary with an oil stain. Even a dry-color, pigment, oil stain would require this extra coat, and while it would not be fugitive like an aniline oil stain, it would not give as clear toned a finish.—I.F.

---

## Finishing Fir Gray

Will you kindly suggest a finish for fir? We want, if possible, a good, solid, one-coat finish, dark gray.—H. F. Co.

---

We believe it is asking a good deal to try and get a one-coat dark gray finish on fir, or for that matter, any one-coat finish except possibly a paint. Fir is a difficult wood to finish in that it has soft spots which soak up, and hard spots which will hardly take a finish at all. To obtain a uniform effect is almost impossible.

Our suggestion would be, in your case, that you apply a gray oil stain, followed by a coat of shellac and varnish. The stain is likely to show very light on the hard spots and quite dark on the soft sections, and the shellac is necessary to keep the varnish from falling into the porous spots.—I. F.

---

## Varnish Crawling

What makes varnish crawl? Have used various kinds of high grade varnishes. Sometimes it flows out nicely and dries that way, again it flows nicely and dries all wrinkled like an old woman. If anything, it seems to wrinkle more over shellac under coat. Temperature of room makes no difference. Any suggestions will be greatly appreciated.—T. C. W.

---

There are various reasons for the crawling of varnish. Almost any cheap rosin varnish will crawl if struck by a cold draught of air during the drying period. Again, an oil undercoater may be the cause, as where shellac is rubbed with a non-drying oil, or a furniture polish containing such an oil.

Sometimes, too, the application of a fatty oil stain which has not been sufficiently wiped before drying will leave a surplus which

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works through the shellac giving it a film resulting in the crawling of the varnish applied over the shellac at these points.—A. J. Howard.

---

From the description of the trouble it is a question whether the cause is varnish crawling or varnish wrinkling. These are two entirely different troubles caused by different conditions, and showing up with different effects. Varnish crawling usually shows up in the form of the varnish apparently pulling together and leaving bare spots. These bare spots often show up in the form of either regular round circles or irregular spots where the under coats show through plainly, and apparently no varnish is on top.

Usually this crawling trouble is caused by the under coat of material being too glossy, or by the presence of grease or some other foreign material in spots on the under coat. It usually can be overcome by breaking the glossy surface of the under coat by rubbing or sanding lightly so that the top coat of varnish has a better chance to get a hold on the under coat.

In the house painting field it is customary, when this crawling trouble shows up during painting, for the painter to add a small amount of water to the paint, stirring it in thoroughly. This is said to overcome the crawling trouble in the majority of cases. As a general rule I would not advocate the addition of water to paint or varnish in any form, but sometimes the mixture of a little water will overcome this trouble.

If the trouble is really wrinkling instead of crawling, it is probably caused by the nature of the varnish and thickness of the coating applied. Certain varnishes which contain a large proportion of China Wood oil, if applied too heavily so as to have a fatty edge or a thick coat, have a tendency to dry on top before drying on the bottom. As the bottom portion of the coat dries it contracts and pulls the top film into a wrinkled form.

I know of no reason why varnish should wrinkle more over shellac than over other undercoats; in fact, I feel that the undercoat would have very little effect upon the tendency to wrinkle.—C. F. Ostrander.

---

## Nitro-Cellulose Finish on Deal Wood

I am very much in need of a little information regarding cellulose finish on deal wood (furniture). We want to get a good high gloss cellulose white enamel finish on deal (fir or pine) furniture at a very keen cost. At present we are doing white enamel oil finish, which is not a hard enough finish. This comprises two coats of whiting filler rubbed down, two coats flat undercoat and one coat of gloss oil enamel.—A. Tracy, London, England.

---

For securing a good high gloss white nitro-cellulose finish on wooden furniture, I would apply two coats of a good grade white undercoater built on a paint base and capable of withstanding the solvent action of the nitro cellulose lacquer applied over it, provided the grain of the wood is smooth and does not contain too many open pores. If the wood contains large, open pores it might be advisable to first fill it with a paste wood filler, to completely fill the pores before

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the white paint undercoat is applied.

After these two or three coats of white paint undercoat have been applied and dried, they should be rubbed down to a smooth surface, and then two coats of white lacquer enamel applied.

The undercoat paint enamel should have at least overnight to dry between coats, but the lacquer enamel can be applied as often as an hour between coats.

After the last coat of lacquer enamel has dried overnight, if the luster is not sufficiently high just as it naturally dries out, it can be rubbed with pumice stone and oil, or sanded with waterproof sandpaper and water and then polished with a good grade of lacquer polish, or with rottenstone and oil or rottenstone and water.

It is possible that the only change necessary, in the present system of finishing, would be to substitute white lacquer enamel for the two coats of flat undercoat and one coat of gloss oil enamel, provided the whiting filler resists the solvent action of the lacquer, and provided enough filling qualities are obtained with these two coats to enable the finish to be rubbed to a perfectly smooth surface. If this is not the case it may be necessary to use one or two coats of a flat undercoat so constructed as to withstand the lacquer solvents.—E. C. Pailinger.

---

You raise a very interesting question in connection with the use of lacquer enamel on deal, which over here is apt to be termed fir or pine. Hard pine would probably not be difficult, but soft pine and fir contain hard and soft or porous sections, on which lacquer enamel, applied directly, would show up glossy or dull according as the wood absorbed it.

It would therefore be necessary to apply a white oil primer similar to what you are now using, but adapted for use under lacquer; in fact, two coats might be needed if the wood were very porous or possessed of pronounced ridges. Such an undercoater will dry in about 18 hours and only the second coat requires sanding, after which you can get a very fine lacquer enamel gloss finish.

You do not state what you are at present paying for oil undercoat and enamel, nor are we familiar with current quotations on lacquer enamels in England, so that we would not be in a position to comment on the necessity you are under for securing a low cost.

Lacquer enamel, sprayed directly on the bare wood, is not apt to be successful unless the wood is sanded very smooth, as all nitro-cellulose finishes follow the surface closely and do not tend to fill as does oil enamel. However, lacquer enamel finishes are becoming very popular in this country due to their great resistance to wear and speed of application, which offsets the higher cost of the material as against oil enamel to a very large extent.—I. F.

---

## Waxing Birch Moldings

We would like information on whether a wax finish may be tumbled on birch moldings 30-in. long, after they are stained either in oil or water stain; oil

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preferably to avoid raising the grain?

We had thought that we might be able to use a wax of the consistency midway between a floor wax and the regular liquid wax, feeding this to the wood in the tumbler by throwing in strips of woolen cloth saturated in this wax solution. Could this be done also by dipping the moldings in the regular stock liquid wax and then tumbling them without the addition of the woolen cloths, or which? We dislike to go to the expense of experimentation, if there may be others who have had experience in this direction. We will appreciate a word from you.—G. I. Co.

---

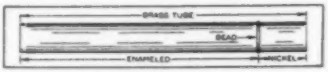
It would be perfectly practicable to apply the wax finish for tumbling, preferably using a semi-liquid wax introduced into the tumbling drum in sufficient amount to give good covering without leaving a surplus. The amount of wax and the extent of tumbling would have to be determined from experiment. We doubt if the use of woolen cloths would give better results than the method above mentioned.—I.F.

---

## Enameling and Nickeling

We would like information on the following proposition: To nickel plate one end of a brass tube to a bead, and enamel the remainder of the tube, at the least cost for quantity production. The difficulties are that the enamel will not adhere to the nickel plate if the entire tube is first nickel plated. If the enamel is put on first, the plating process damages the enamel. Also, the cost is excessive if the tube is tip plated, keeping the nickel plating off from the portion that is to be enameled.

We are still uncertain whether an air-drying celluloid-base enamel will adhere to this brass tube better than an oil enamel, baked on. We also would like to




The piece to be finished

have any information that you can give us in regard to the best method of making this enamel adhere to the brass tube. The accompanying drawing shows a sample tube.—S. S. Mfg. Co.

---

The following method is suggested: Nickel plate the entire piece, but buff only that portion above the bead which is to remain in that luster. Then provide a board in which are punched holes that will hold and conceal the buffed portion up to the bead, leaving the remainder only exposed. When the board has been filled, spray with the desired shade of lacquer enamel, and place the board to one side until the tubes are dry.

We believe that lacquer enamel will adhere to either the brass or rough nickel plating equally well, and that in durability, as against a baked oil-enamel, will be sufficiently equal so that the lacquer enamel will show a saving both in speed of finishing and economy of equipment.—I. F.

---

## Wax Finishing

Replying to the question under this heading in November issue, many people in the U. S. have found it quite practical to produce a wax-like finish on open-pore or semi-open-pore work, by applying one or two coats of

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nitro-cellulose lacquer directly over the stain. This dries with a velvet luster so closely approximating that given by a wax finish that the difference is not apparent to the average person. Furthermore, the lacquer finish is much more durable, from the waterproof standpoint, than a shellac and wax finish.

No rubbing or sanding is done at all other than to remove any dirt nibs or such defects. The stain for use under lacquer must be a water stain for best results, although certain shades of oak and walnut oil stains, which contain no analine dye or other materials that are soluble in lacquer solvents, can be used quite satisfactorily if allowed to dry thoroughly before coating with lacquer.

If a more built-up type of finish is wanted, that is, one in which the pores of the wood are filled approximately level with the surface of the surrounding wood, a paste wood filler should be used over the stain and allowed to dry before the lacquer is applied.

The customary rubbing operation can be eliminated on this semi-open-pore effect by applying a coat of full-body lacquer, letting it dry, rubbing lightly with fine steel wool and then spraying a light coat of clean lacquer reducer over the work. The reducer softens the lacquer just enough to heal up the small scratches left by the steel wool, and leaves a smooth, velvet finish very closely resembling a velvet rubbed or waxed finish.—T. L. R.

## Dipping Lead Pencils

Referring to a question under this heading in November issue, it is possible to dip lead pencils and similar articles in enamel, varnish or lacquer materials, by hand, either singly or with racks which hold a number of the pencils at one time.

When dipping the pencils singly they are usually placed in upright position to drain and dry on a screened frame, which allows the excess material to flow off without forming a puddle at the base of the pencil; or they can be fastened with a pin or some type of clamp before being dipped, and then hung up to drip and dry. In either case, when the material is about through dripping the pencils can be inverted to allow the remaining material to flow back down the pencil and leave a more uniform coating from top to bottom.

By the rack method of hand dipping, the pencils are first fastened into a suitable rack which has needle like points or something similar for holding the pencils. Often the rack and the pencils are dipped into the tank. After being allowed to drain the rack may be inverted to get the desired flow-back.

There are now on the market mechanical dipping machines for this type of work—machines which can be regulated to coat as high as 50,000 or 100,000 objects a day. These machines make use of suitable racks for holding the pencils in quantities of about 130 to a rack.

The rack is lowered automatically to the desired depth in the dip tank and then raised slowly and evenly, without vibration, out of the coating material. In the case of lacquers, either colored or clear, the speed can be regulated to approximately equal the flowing rate of the lacquer, so there is no dripping after the work leaves the tank.

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This speed can be regulated to fit most any size or length of object and practically any coating material.

The small drop of material left on the bottom end of the pencil can be removed by lightly touching a piece of paper to the pencils. This method gives a uniform coating of greater thickness than by the hand method, and it is quite economical, since two or three operators can handle the entire work of placing the pencils in the racks and operating the machines up to a capacity of about 100,000 per day.

Various finishing materials are used for pencils, but clear lacquers and lacquer enamels are the most universally used, since they dry rapidly and give a beautiful, hard, tough, durable, wear-resisting finish.

At least one company is now making a full line of clear and colored lacquers that gives an extremely pleasing finish, with a high degree of luster in only one coat. Lacquer finishes are also desirable in that they withstand the operation of embossing or printing on top of the finish without chipping.—D. E. C.

## Finishing Lead Pencils

In your November issue we note a request for method for coating lead pencils with pyroxylin lacquer.

We suggest that your client—S. Y. R.—consider the use of a rubber coating tool, through which the pencils would be dipped into a proper lacquer. A beautiful high-lustered finish can be obtained this way, that would be very tough and durable and the consumption of material would be as low—if not lower—than any other method, and large quantities could be handled very quickly.

The method we mention is very similar to the one being used by the majority of broom handle factories.—Reliance Varnish Co., Inc.

## Cleaning Without Acids

In reply to a question under the above heading in November issue, we suggest cleaning metals with naptha and sandpaper, then washing with naptha. This is the method which is understood to be used for cleaning fenders in the factory of a large automobile manufacturer.—I.F.

A question under the above heading appears in November issue.

There are several methods for cleaning unpainted sheet steel to remove grease, sand and rust without the use of acids or chemical patented cleaners. The proper method to use depends upon conditions which surround each job. For some work it is better to use either acid or a proprietary chemical cleaner, than to attempt to use any other method.

Sand-blasting is one of the old established methods of cleaning metal. By this method a stream of fine sand is blown against the surface by compressed air, the sand particles taking off the rust, dirt, scale and grease, and leaving a perfectly clean surface. Small portable sand-blasting machines are now available for use in the shop or out of doors.

While sand-blasting gives a clean surface, it has its disadvantages in that it creates a lot of dust and dirt if used inside the shop. A tight room must be used for this work alone, if the finishing department is nearby, to

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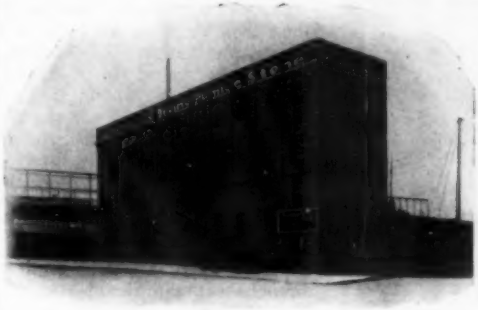

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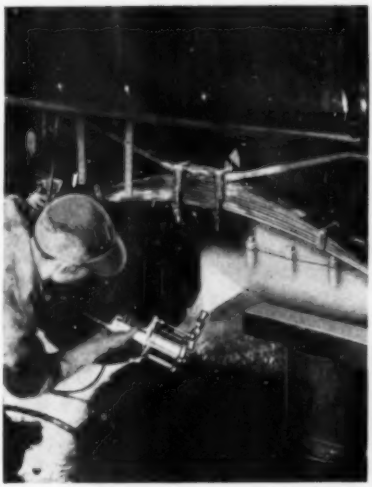
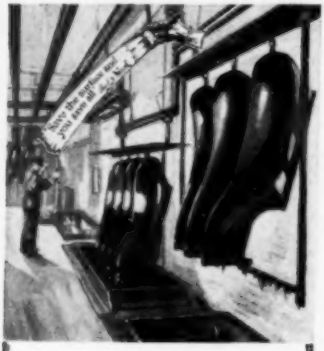


*Continuous spraying in any position*



## BLACKS FOR ALL PURPOSES

Blacks are used to decorate and protect a great variety of products and surfaces. From a hairpin to a locomotive. From a button to a steamship. From a sash lock to a tank car. From a tack-head to an automobile. From a window screen to a skyscraper. Blacks have the greatest number of uses and—as naturally follows—abuses. There must be a great variety of Blacks to accommodate every use—and Lucas has it.

**Lucas**
INDUSTRIAL BLACKS

embrace a wide range of grades which are best suited to finish and protect the surfaces for which they are recommended. The research laboratories of Lucas can solve your paint and varnish problems. Write Dept. W-4.

**John Lucas & Co., Inc.**
Paint and Varnish Makers Since 1845
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**Lucas**
**Paints and Varnishes**
*Purposely Made for Every Purpose*

prevent dust and dirt settling on freshly finished work.

The sand is broken into very fine particles while being used and the workman must wear a mask and goggles to prevent this dust from entering his eyes, nose, throat and lungs. Sand-blasting leaves the metal in a slightly pitted condition which, while it gives a good footing for the first coat of paint, must be covered by sufficient coats to fill up these small pits to a level surface. Because the raw metal is exposed to the air, sand-blasted work should be coated promptly to prevent the starting of rust which might be invisible at the time of coating but which might continue to grow under the finish, and ultimately spoil the work.

Grease and sand can be removed quite effectively by washing the metal with naphtha or gasoline that is free from high-boiling, oily fractions, provided it is wiped thoroughly with clean, dry cloths before the naphtha has evaporated. Care should be taken also to change the gasoline quite frequently, else sufficient of the oil will be dissolved in the gasoline to really spread a thin film of grease over the entire surface.

Unless the cloths are changed frequently the same trouble will result. By this method the rust will have to be removed by sanding (preferably while the work is wet with gasoline) with emery cloth or one of the sandpapers made from a sharp, hard artificial grit.

Grease also can be removed quite effectively by placing the work in an oven and running the temperature up to 450-degs. F. This will evaporate and burn off all the oil. The surfaces

should be wiped clean with cloths or with a wire brush, after this baking operation, to remove the sand and any dirt deposit left by the evaporated oil. The rust will have to be removed with sandpaper or some other abrasive.

Another method, that is finding some favor, is the use of rapidly revolving brushes made of wire. This removes the rust, oil and sand at one operation. Also, there are electro-chemical processes of cleaning which depend upon an electric current to remove all rust, oil and dirt while the metal article hangs in an electrolytic bath.—R. L. Masterson.

## Washing Machine Finish

In October issue of INDUSTRIAL FINISHING, the K. K. Washer Co. asks for information on how to finish washing machine lids to prevent swelling and shrinking under the varying moisture conditions to which they are exposed.

The answer given by I. F. is a good one and would help solve the problem. However, I believe a better solution of the problem is to first apply a good coat of China wood oil, and when this is dry follow it up with a coat of aluminum paint made of the same kind of oil. Tests have shown aluminum paint to be a remarkable moisture-proofing material for wood. It is not affected by water and water can not penetrate it.

After all, it is a question whether the problem is one for the painter or finisher alone to solve. The problem, as I see it, is how to construct the top so it can not swell when it absorbs water, which it is sure to do in time when the paint has worn away and the oil has lost its potency. To do this I would sug-

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*Makes a Surface Like Glass*

Sprays freely
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Does not bloom
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Apply two coats in one day and get a LACQUER FILM at ONE-HALF THE COST

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You can save at least that much on your Paint and Varnish Remover, and have a Remover equaled by none. In fact after using it we believe you will say that it is the BEST Remover you have ever used, regardless of price.

All that you need do is to secure two simple liquids and pour the two together.

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Saving money on your refinishing costs. Just send us your card or letterhead and a copy of "Getting Away From the High Cost of Paint and Varnish Remover" will be mailed you FREE.

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*No Matter*

what brush you buy for your spray painting, specify a

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**COMPRESSOR**

It pumps more air and less oil

**Kellogg Manufacturing Co.**
ROCHESTER, N. Y.

gest making the top of plywood—three-ply—with the center ply having the grain at right angles to the grain of the two outer plies, and using a water-proof glue for cementing the plies together.

Wood does not expand or contract endwise to any appreciable extent, and if the grain of the two outer plies is at right angles to that of the center ply, and all three are firmly cemented together with waterproof glue, one can readily see that expansion and contraction would be next to impossible. The centre ply would prevent expansion of the two outer plies, and vice versa. To make such a top the plies should be properly balanced, which means that the thickness of the center ply should equal the combined thickness of the two outer plies.

When I say that these plies must be cemented together with waterproof glue, I mean a glue that cannot be again dissolved in water after it has once become hard. There are such glues on the market. Washing machine tops made this way and finished with the aluminum paint ought to last during the life of the machine, without giving any trouble.

There is another point to remember. A paint or varnish dried in a high temperature is more durable, and more proof against moisture than the same paint or varnish dried at a low or moderate temperature. These waterproof glues will stand as much heat as the wood, and the paint will stand a temperature well above 175-degs.F. Such a temperature will greatly improve the wearing and waterproofing qualities of the paint.—Wm. P. Tyler.

## Selling the Finish

An article in October issue of this journal by G. E. Moran, under the heading "The Finish—a Selling Point," seems to me to be one worthy of a little enlargement. A few years ago I had charge of a factory making a line of furniture with a nation-wide reputation for quality, nevertheless it was not always possible to sell goods on our own reputation.

I recall there was one dealer from whom our salesman had never been able to get an order. The salesman who called on this dealer took sick at a time when it was important to cover his ground. I was detailed to look after the work. Before leaving on the trip our manager said, "I don't think there is any use calling on Harder; we have never been able to sell to him. The most important thing just now is to hold what we have."

I had to change trains at the town where Harder had his place of business and at the last moment I decided to call on him. On our goods we used a brand of material that was well known through national advertising, and our finisher was a man well known to the furniture industry. I decided to stress these two points.

I praised the finish on the goods that were then on Harder's floor, and complimented him on his good judgment in selecting them. But I told him I believed the finish on our goods would make a more direct appeal to the better class of his select trade, and that the well known brand of finishing materials which we used, together with our own trademark, would be a strong selling point with his customers. Before I left, Harder had given me an order for one of our best

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AROLAC
Wood—Metal Finishes.
Can be dipped or sprayed.
Air dried and waterproof.
Used on Automobiles, Wood Furniture, Metal Novelties, and Toys.
Specialists in Automobile Finishes. Colors matched in gloss or flat finishes.
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CELLULOID LACQUER ENAMELS
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dining room suites—and in time for me to catch my train.

Before our salesman got back to see this man again a repeat order had been sent in by mail. Of course our finish was all I had claimed for it. The varnish was a kind that rubbed to a perfect finish, and was durable. Our stains were clear, and the correct shade, and every piece was cleaned perfectly. The finish is certainly a great selling point.—V. L. Lacey.

Buy from the pioneer manufacturer of
WOOD LACQUERS
Made in Newark, N. J., since 1857
*Write us your requirements*
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90 Worth St., New York
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HARDNESS - STABILITY - GLOSS
HIGHEST MELTING POINT
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GUARANTEED
W. W. ROSIN COLOR
for Resistant Lacquers and Light Varnishes and Enamels
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## Antique Maple Finish

A beautiful finish for maple, recently developed, consists of an antique or high-lighted effect in a clear "honey" color blending off into a rich golden brown and finished dull, the whole treatment developing fully the possibilities of the wood and giving a finish of unusual character and beauty.

The treatment is simple, there being no wiping required, no filling and little or no sanding. The base of the finish is a special stain of an unusual type which may be applied in any way desired—most conveniently by dipping. Following this the high-lighting is done by spraying a high-lighting stain over the parts of the work it is desired to darken.

The finishing may be accomplished in a variety of ways and any desired type of finishing coats may be used. The most satisfactory finish is said to be shellac followed by a dull lacquer.

## New Use For Spray

A late interesting development in the spray painting line worthy of mentioning is a pneumatic machine for rapid painting of traffic, safety and special zone lines on highways, with a special attachment for spraying fire plugs, guard-rails, bridges, signs and lettering on streets sprayed over stencils. It is claimed to do the work of ten to fifteen men using the brush method and requires

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BRONZE POWDERS
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ALL KINDS OF FINISHES
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only one operator and paints as fast as a man walks.

In view of the limited appropriations heretofore of the state and municipal highway departments for this purpose; the tremendous increase in vehicular traffic; the alarming dangers to life and property on modern heavily traveled highways and streets; the shortage in parking spaces in congested areas; the great economy effected by this improved device will considerably increase the consumption of paint for highway marking and painting adjacent objects. It fits in well with efforts exerted by the industry to encourage highway departments to use more paint in the interest of safety.—H. W. Rice, at the 38th annual meeting of National Paint, Oil and Varnish Association, Cleveland.

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To guarantee that a finish, when applied to anything, anyhow, anywhere, by anybody, will yield a satisfactory job, is a gamble—with the odds against the manufacturer.

Paint and varnish industries are called upon to reckon with altogether new types of finishes —the products of research in nitro-cellulose and solvents.

# CLASSIFIED

Advertisements under this heading 45 cents a line, minimum charge $1.35. Use this department to obtain help, find positions, buy and sell equipment, dispose of manufacturing properties, etc.

**WANTED**

Position as foreman finisher. Have had 30 years' experience. Thoroughly understand production, also how to handle help. On Case Goods and Chairs. Can give the best of references. Address IF-121, care INDUSTRIAL FINISHING.

**WANTED**

Experienced salesman to sell complete line of varnishes, enamels, lacquers to industrial trade in Chicago. Prefer one with established trade in this district. Address IF-120, care INDUSTRIAL FINISHING.

**FOR SALE**

Bus body factory owner must retire on account of health and will sell factory which invoices at $35,000, including real estate; terms to the right party. Factory now running and has reputation for high-grade custom built bodies. Complete woodwork and some sheet metal machinery. Write for complete description. Box 716, Lebanon, Ind.


**Furniture Patchers**
**like this Electric Furnace**
**HEAT-A-KNIFE**
**Danger Proof--Economical**

Ask us about our two heat furnaces which have proven very satisfactory. These stoves operate by means of two heat snap switches attached to base of furnaces. The first point brings stove up to red heat very quickly and second point reduces heat to low heat or working heat.

No. 5— Furnace; $7.50, 110-120 Volts. $8.50, 220-240 Volts.

No. 50—Two Heat Furnace; $10.50, 110-120 Volts. $11.50, 220-240 Volts.

No. 51—Furnace; $10.00, 110-120-Volts. $11.00, 220-240 Volts.

No. 52—Two Heat Furnace; $13.00, 110-120 Volts. $14.00, 220-240 Volts.

$2.00 extra for red light current heat indicator attached. F. O. B. Chicago.

Furniture Patchers' Knives, $.35; Furniture Patching Cement Sticks, $1.75 per dozen; Furniture Patching Transparent Sticks, $2.00 per dozen.

A new adjustable handle rest prevents wooden handle of knife burning while being heated. A rust-proof and scale-proof oven is mounted on an asbestos base. Furnace is strong, solid and well made throughout. No. 51 or 52 oven has knife opening 2¾" wide, ¾" high, 7½" oven. No. 5 or 50 is 1⅛"x⅛"x5". Both complete with cord and plug.

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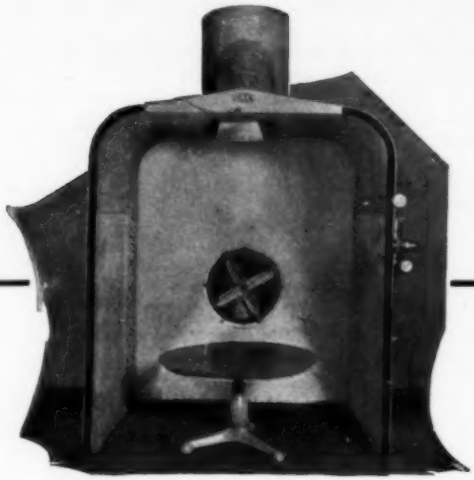
**815 E. 43rd St., Chicago, Ill. Tele. Oakland 1252**



# The BINKS Spray Booth
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In the design of the Binks spray booth, the health of the operator has been our first consideration. Incidentally his comfort goes hand in hand with his health. The operator using a Binks booth knows his health is safeguarded and he is free from petty annoyance and discomfort. The natural and inevitable result is better and more uniform work in larger volume.

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